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A description is made of an attempt to apply to first grade reading instruction the idea that children can benefit when the teaching of reading is adapted to their cognitive style. Pretesting was done to discover the strengths and weaknesses in learning aptitudes, and the teaching procedure was modified to emphasize comparatively strong abilities. Two hypotheses were researched: that first-grade children with low visual perception readiness scores will benefit when given individualized instruction emphasizing kinesthetic or phonic instruction and that the ability to profit from such instruction is related to measured aptitude for the particular method of instruction.

The twenty children given special instruction during individual conferences achieved better in reading than the statistical predictions based on the visual perception scores indicated. No significant association could be established with either the specific method of teaching used or the presence of presumed aptitude for that method.

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INDIVIDUALIZING FIRST-GRADE READING ACCORDING TO SPECIFIC LEARNING APTITUDES

by

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The project was originally proposed by Philip Levinson, Assistant Principal of P. S. 201, Queens, an elementary school which is related to the Education Department of Queens College as a Campus School. Plans were developed by the writer with the assistance of the P. S. 201 - Queens College Committee, and were approved by that committee, the Elementary School Division and the Bureau of Educational Research, Board of Education of the City of New York. Members of the P. S. 201 - Queens College Committee during the period 1962-64 were: I. Edward Moses, Principal, Philip Levinson, Assistant Principal, and Sylvia Dunsky and Adeline Moskowitz, teachers in P. S. 201; and Thelma Adair (Chairman), Shirley Greene and Albert J. Harris, members of the Queens College Education Department.

The first-grade teachers were: Joyce Bohnenberger, Jane Mandel, Judy Rubin and Diane Schoenfeld. The kindergarten teachers who conducted the pretesting program for the second year of the project were: Ruth Bronstein, Doris Edelstein, Yvette Pollack and Judy Schwartz.

Staff members of the Educational Clinic participated in a variety of ways: administering tests, helping to develop experimental tests, test scoring, etc. They included Leonard Grossman, C. Lola Gersh and several others.

The statistical analysis was done mainly in the Office of Research and Evaluation. Joseph Impellitteri carried out the analysis of the 1962-63 results. The 1963-64 analysis was done by Genaro LaChica, with assistance from David Leiman and Mary Gasiorowski.

The writer assumes full responsibility for the supervision of the project and for the final report.

Albert J. Harris

Individualizing First-Grade Reading According to Specific Learning Aptitudes

Albert J. Harris
The City University of New York

The idea that children can benefit when the method of teaching reading is adapted to their cognitive styles is not a new one. Harris and Roswell (4) recommended the use of sample lessons (visual, phonic, kinesthetic) to help in determining the choice of remedial teaching method with disabled readers. This procedure was developed into a standardized procedure by Mills (8). Sample lessons have been recommended as a practice useful in reading diagnosis by Harris (4) and Roswell and Natchez (10).

This paper describes an attempt to apply the same principle--pretesting to find strengths and weaknesses in learning aptitudes, and modifying teaching procedure so as to emphasize comparatively strong abilities--to first-grade reading instruction. Readiness tests were used instead of sample lessons. The study was undertaken as a cooperative venture of Public School 201, Queens, and the Queens College Educational Clinic.

The study was planned to check two hypotheses. The first was that first-grade children with low visual perception readiness scores will benefit when given individualized instruction emphasizing kinesthetic or phonic instruction. The second was that ability to profit from such instruction is related to measured aptitude for the particular method of instruction.

The first year (1962-63) was spent on a preliminary pilot study; the main project was conducted during the second year, 1963-64.

Pilot Study

The year 1962-63 was designated a tryout year, in which pretests would be tried out, and the first-grade teachers would have an opportunity to explore a method of instruction different from their usual way of teaching word-recognition skills

Pretests. In October the following tests were given: Lee-Clark Reading Readiness Test (7), Gates Auditory Blending Test (2), Wepman Auditory Discrimination Test (11), the Bender Visual-Motor Gestalt Test (1), and the Queens College Motor Test. The Lee-Clark, Bender, and Queens College Motor Test were administered as group tests.[1] The Bender was scored according to Koppitz (6); for statistical treatment, error scores have been inverted. The Gates Auditory Blending and Wepman tests were administered individually. The testing was done by psychologists on the staff of the Educational Clinic.

The scores on the Letter Perception and Word Perception subtests of the Lee-Clark were summed to provide a "visual perception" score. The Gates Auditory Blending was found to be much too difficult for most of the children, resulting mainly in zero scores, and was dropped from further consideration. The Wepman test was retained as a measure of auditory perception. The Bender was considered the major measure of aptitude for learning by a kinesthetic method, stressing tracing and writing. The Queens College Motor Test was an experimental test designed to measure ability to keep a pencil line between two printed lines; it was not sufficiently discriminating in this population. In addition, Pintner-Cunningham I.Q.'s were available from testing in first grade.

Procedures. There were four first-grade classes, which had been grouped according to the recommendations of the kindergarten teachers. In January each teacher was given a profile chart for each child in her class. This showed the child's relative standing in visual, phonic, and kinesthetic aptitudes according to local percentile ranks on the Lee-Clark Visual, Wepman, and Bender. Each teacher was asked to select two children and give them individualized help using a kinesthetic method. They were to choose the children on the basis of two criteria: (1) the child had made slow progress in the first half-year of reading; and (2) his kinesthetic aptitude was higher than his visual aptitude.

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1. Permission to make enlarged reproductions of the Bender designs was obtained from Dr. Bender and the American Orthopsychiatric Association.

These teachers were already teaching first-grade reading by an individualized method, which had been introduced to the teaching staff through a special workshop (9). It therefore did not require any reorganization of general classroom routine to provide individualized kinesthetic help. Since none of them had used a kinesthetic procedure before, they had opportunities to learn about several variations of kinesthetic procedure from the writer, and from two colleagues, a teacher of a class for brain-injured children and a corrective reading teacher. All four teachers used a kinesthetic procedure, but each selected what appealed to her. Thus, one wrote words with glue and sprinkled sand over it, to make raised letters vivid to the touch; another printed words on cards, which were traced with a pencil.

Results. In May, 1963, the four classes were given the Metropolitan Achievement Tests, Primary I Battery. Statistical results of the pretests and the Metropolitan are given in Table I. Of approximately 120 children in the four classes, 110 had complete pretest and Metropolitan scores. Ten of these (two in each of two classes, three in each of the other two classes) had been taught by a kinesthetic method. The results in Table I are based on the 100 other (control) children.

The means show that this population was well above average as compared to national norms. On the Pintner-Cunningham and Lee-Clark, the median child in this population ranked at about the 70-75th percentile. There was, however, a normally wide range of individual differences on those tests.

The intercorrelations show low to moderate correlations between the various pretests and the Metropolitan scores. If one takes the mean of the three reading sub-test scores as probably more reliable and valid than the separate sub-tests, the highest *r* was for the Lee-Clark total score (.508), followed by Pintner-Cunningham I.Q. The correlations for the Wepman and the Queens College Motor Test were disappointing, below .40; the Bender gave only a slightly better correlation (.418). It is noteworthy that the MAT Arithmetic score was predicted more

accurately by most of these pretests than the reading scores were.

The results for the ten children who were given some kinesthetic teaching during the second half of the year are shown in Table II. For comparability, all results are given in s-scores. The hypothesis that these children would learn to read at a level better than predicted was not supported. Predictions were based on the Lee-Clark Visual score utilizing a regression equation. Five of the children exceeded predictions; five fell short of it.

It seemed possible, however, that the selection of these children by their teachers had not given enough attention to the criterion that their scores on the test used as a predictor of kinesthetic aptitude (Bender) should be higher than their Lee-Clark Visual scores. Actually, seven of the ten were above the group mean on Lee-Clark Visual, and three were actually lower on the Bender than on the Lee-Clark Visual. These children had benefited from special attention, as shown by the fact that although selected partly on the basis of slow progress up to January, seven of the ten achieved reading scores above the group mean. But no relation could be drawn to the use of kinesthetic procedures, nor to the discrepancy between Lee-Clark and Bender scores.

The Main Study

Before the results of the Pilot Study were available, a decision was made to proceed for a second year. The following changes were decided upon: (1) In order to allow specialized instruction to begin as early in the first grade as possible, the pretests would be given in kindergarten. (2) The pretest battery would be changed, eliminating tests requiring individual administration and substituting tests of hopefully higher predictive efficiency. (3) The children to receive special instruction would be chosen by the research staff, not by the teachers. (4) Pretest scores would not be divulged to the teachers. (5) Both phonic and kinesthetic methods would be used. (6) For each special method, there would be

two groups: an experimental group, with low visual perception scores and higher scores on the test related to the method, and a control group, low on both.

The Pretests. In May, 1963, the following battery of pretests was administered: (1) the Gates Reading Readiness Tests, Test 2, Word-Matching, Test 3, Word-Card Matching, and Test 4, Rhyming; Tests 2 and 3 were summed to give a "visual perception" score, and Test 4 was used as the predictor of aptitude for phonics instruction; (2) the Bender Visual-Motor Gestalt Test, presented by means of slides as a group test, and scored according to Koppitz; (3) the Queens College Visual-Motor Test, an experimental test of 13 designs ranging from extremely simple to quite difficult (the designs were presented on the left side of the paper and were copied in blank spaces on the right); and (4) the Queens College Educational Clinic Reading Readiness Rating Scale, a quantified rating scale of 20 items, filled out for each child by the kindergarten teachers (this will be referred to as Rating Scale for brevity); (5) the Pintner-Cunningham I.Q.'s were available from school testing in April.

Procedure. Scoring and tabulation of the pretests were completed in October. On the basis of the pretests, four groups were selected.

1. Kinesthetic Experimental: low Gates Visual Perception, higher Bender.
2. Kinesthetic Control: low Gates Visual Perception, equally low Bender.
3. Phonic Experimental: low Gates Visual Perception, higher Gates Rhyming.
4. Phonic Control: low Gates Visual Perception, equally low Gates Rhyming.

In the selection, the other pretest measures were ignored. The four classes had been set up "homogeneously" on the basis of global kindergarten teacher recommendations. It was originally intended to have two children in each group in each of the four classes. It was not possible to find sufficient Experimental children in the lowest class, or enough Control children in the highest class.

Each teacher was given two lists, one for kinesthetic instruction and one for phonic instruction. They did not know which were "experimental" children and which were "control" children; when asked, they achieved just 50 per cent success in their guesses. The conditions agreed upon included the following:

1. The teachers would continue to use the "individualized" method to which they were accustomed. This involved a combination of whole-class instruction with experience charts, silent reading at seats, and individual conferences with each child as often as possible--usually twice a week.
2. The children selected for special instructional procedures would receive this help during their regular conferences. They were each to receive the same total conference time as their classmates.
3. The teachers were to stress kinesthetic practice or phonic practice according to their best judgment; exact procedures and materials were not specified. Occasional observations in the classrooms revealed that there were differences among the teachers in the ways they used kinesthetic and phonic procedures.

The four teachers were all young, and all were graduates of Queens College. Three stayed in the study for the full two years, while the fourth took a maternity leave in April of the second year and was replaced by a "permanent substitute."

The three reading sub-tests of the Metropolitan Achievement Test, Primary I Battery, were administered to the four classes simultaneously in May, 1964.

Results. The means and standard deviations of the 1963-64 pretests and final tests are shown in Table III. The small size of the total population (N = 62) is due in large part to the fact that there were many changes in the classes between the end of kindergarten and the beginning of first grade. This was partly the result of a number of transfers to parochial schools, balanced by new arrivals who had not attended kindergarten in that school. There was also some shrinkage during the year

and some absence during final testing. Classes remained at about the same size as in 1962-63, but the usable total population with complete testing was only 62, as compared with 110 the previous year. Despite the convenience of doing readiness testing in kindergarten, it does not seem advisable in schools with as large a turnover as this school had.

Two sets of data are shown in Table III. One is for the full 62 cases, including the 20 who were taught by special methods. The other is for the 42 other children, who were taught according to the teachers' usual procedures. Since the 20 children selected for special instruction were all low on the Gates Visual Perception score, it is not surprising that the Control Group (the remaining 42 children) were somewhat higher than the total population on all measures. The only exception was chronological age, in which the mean difference of half a month is not significant. It may be noted that this population scored substantially higher I.Q.'s on the Pintner-Cunningham than the total population in 1962-63, whose mean I.Q. was 109. The main difference is that the present population is restricted to those who attended this school for both kindergarten and first grade; the 1962-63 population included many who entered at the beginning of first grade.

Intercorrelations among all pretests and final tests are shown in Table IV. Correlations for the total population of 62 are shown in the upper part of the table; correlations for the Control Group of 42 cases are shown in the lower part. It is evident that, in general, correlations between pretests and final tests were higher than those obtained in the 1962-63 Pilot Study. This may be due in part to the use of more effective pretests. It may also suggest that the teachers, with an additional year of experience and knowing that they were in the definitive stage of an experiment, were more effective in teaching reading and dealing with differences in learning ability.

Despite the fact that 20 children with comparatively low Gates Visual

Perception scores were included in one set of r's and excluded from the other, the two sets of correlations show very few differences. The main exception is the Gates Rhyming test, which gave higher r's in the Control Group than in the Total Population. Correlations in the .60's and high .50's were obtained for four of the pretest measures: Gates Visual Perception, Pintner-Cunningham, Gates Rhyming, and the Rating Scale.

A multiple correlation based on these four measures gives a quite high correlation with the final tests, r = .775. However, it is open to question whether this would hold up in replication.

The low correlations between the Bender and final tests are most easily explained in terms of the difficulty of administering the Bender as a group test to kindergarten children. The tasks were very difficult for them, and the examiners reported that they were unable to prevent the children from turning their papers. Thus, the many "rotation" items in the scoring are of dubious validity. This was not true to such an extent in the Pilot Study, but even there, the scoring of "rotations" was considered questionable.

The two experimental instruments came out fairly well. The Queens College Visual-Motor Test had r's of .42 and .43 with MAT Average Reading. The Rating Scale, with r's ranging from .55 to .61 with the various reading measures, seems to have real promise as a predictive measure.

The main question of this study was to determine if children, selected as having a non-visual aptitude higher than their visual perception aptitude, would do significantly better: (a) than what they would be predicted to achieve on the basis of their visual perception scores, without this special instruction; (b) than another group, equally low in both visual perception and the aptitude relevant to the special teaching method.

The predicted scores were derived from the repression equation based on the correlation of Gates Visual Perception with MAT Average.

Although the numbers are too small to allow definitive conclusions, tentative answers can be given from the results summarized in Table V. Taken as a total group, the 20 children given special treatment had a mean grade equivalent of 2.11 in reading, as compared with a predicted mean of 1.90. This difference of .21 years has a 19 to 1 chance of being significant.

However, there is no evidence that the children responded to instruction as predicted by specific pretests. Instead, the two Control Groups given special instruction actually did slightly better than the two Experimental Groups, who had scored higher on the pretests considered relevant. The differences are probably not significant.

This peculiar finding deserves careful examination. The Bender, used as the criterion for selecting the Kinesthetic Experimental Group, had such low predictive ability in this study (r = .171) that obviously the differentiation of children with kinesthetic aptitude from those lacking in it was ineffective. Possibly, a different result might have been obtained with a more valid test of kinesthetic aptitude. This explanation, however, fails to account for the similar result in the two Phonics groups, differentiated by use of the Gates Rhyming test which correlated .592 with the criterion. The slight differences between the two Experimental Groups and the two Control Groups fall within the range of chance variation, but they are both in the unexpected direction. It seems best to ascribe this phenomenon to chance variations.

It is evident, also, that the two groups given special help with phonics seem to have done better than the two groups given kinesthetic help. This is possibly explainable in terms of the amount of practice time available to the pupils. The kinesthetic procedures could generally be used by the children only when the teacher was holding individual conferences with them. They could review word cards by themselves, but they could not engage in new kinesthetic learning without the

teacher. In phonics, however, the teacher could assign specific workbook pages in phonics workbooks, so that learning could proceed without the teacher's direct participation. Phonic workbooks (Phonics We Use) were available and were utilized. Thus, individualized instruction stressing phonics may have been slightly more effective than individualized instruction stressing kinesthetic practice because more could be done by the child on his own.

One cannot, however, disregard the possibility that the superiority of obtained scores over predicted scores for these 20 children is entirely due to Hawthorne Effect. Each teacher was asked to give a few children some special teaching. There is no evidence that conclusively demonstrates that the method of instruction actually had any bearing on the results. The simplest explanation is that the 20 children given special instruction tended to achieve slightly better in reading than would otherwise have been predicted, but neither the presence of aptitude for the specific method nor the nature of the method used with the child can be established as causally related to the results obtained.

This does not rule out the possible value of teaching beginning reading in relation to the specific strong aptitudes of the learner. However, if further research on this topic is to be fruitful, it is probable that several conditions will have to be met:

1. More valid group tests of specific aptitudes for learning by kinesthetic and phonic methods will need to be found or developed.
2. The teaching procedures to be used will have to be more nearly uniform, and better controlled.
3. A greater proportion of the total reading time of the children will have to be spent utilizing the special method of word study. This will probably require small-group instruction rather than individualized instruction.
4. The study will have to be carried on with larger numbers of children, so as to increase the reliability of the findings.

SUMMARY

This paper reports an attempt to verify the hypotheses that children who score low in reading readiness tests of visual perception will benefit when taught by a kinesthetic method or phonic method; and that children with relatively high visual-motor or auditory perception pretest scores will benefit more from such instruction (chosen to fit the high pretest score) than children who score low in all three kinds of pretests. The 20 children given special instruction during individual conferences achieved better in reading than the statistical predictions based on the visual perception scores, but no significant association could be established with either the specific method of teaching used or the presence of presumed aptitude for that method.

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Table I

Means, Standard Deviations and Intercorrelations of Pretests and Final Tests

VARIABLE	MEAN	S.D.	INTERCORRELATIONS 1	2	3	4	5	6	7	8	9	10	11
1. Pintner-Cunningham I.Q.	109.78	15.96	.477	.566	.539	.491	.379	.403	.380	.445	.460	.508	.490
2. Lee-Clark Visual Pcpt.	34.04	7.58	---	.571	.980	.470	.408	.419	.358	.444	.432	.576	.470
3. Lee-Clark Vocabulary	17.61	2.18		---	.723	.482	.394	.481	.411	.473	.386	.584	.465
4. Lee-Clark Total	51.65	9.01			---	.513	.439	.469	.401	.488	.457	.626	.508
5. Bender Visual-Motor	10.17	3.73				---	.345	.544	.294	.429	.320	.462	.418
6. Wepman Auditory Discr.	29.42	7.77					---	.314	.280	.373	.294	.368	.362
7. Queens College Motor Test	14.69	3.35						---	.267	.380	.306	.290	.363
8. MAT Word Knowledge*	49.05	10.24							---	.774	.686	.569	.825
9. MAT Word Discrimination	51.57	11.15								---	.815	.635	.963
10. MAT Reading	49.59	8.42									---	.684	.914
11. MAT Arithmetic	48.95	7.63										---	.690
12. MAT Average Reading	50.29	9.27											---

Note:

N = 100, omitting the 10 experimental children and those with incomplete data.

* MAT standard scores.

TABLE II

Obtained and Predicted Scores for the Children

Taught by the Kinesthetic Method.

Pupil	Lee-Clark Visual	Bender	Pint-Cunn I.Q.	M.A.T. Avg.Rdg.	Obtained -Predicted
1	.52	- .85	.58	- .46	- .84
2	.52	.76	1.14	.18	- .37
3	.39	.49	.45	.62	.43
4	.13	.49	.77	.29	- .03
5	.39	1.03	1.14	-1.00	-1.48
6	-1.59	-1.12	.33	.18	.53
7	.26	- .58	1.27	.40	.03
8	- .40	2.10	- .42	1.59	1.78
9	.65	.76	-1.74	1.48	1.84
10	-1.06	-1.65	-1.30	-1.11	- .30

Note: All scores are expressed in terms of s-scores, with the mean of the population of 100 set at zero and the standard deviation set at 1.0.

TABLE III

Means and Standard Deviation for Pretests and Final Tests, for Total Population and for Population Minus the Special Instructional Groups

Variable	Total Population		Control Group Only	
	Mean	S.D.	Mean	S.D.
1. GATES VIS.PCP.	22.29	8.14	25.60	7.58
2. GATES RHYMING	12.37	1.90	12.55	1.82
3. BENDER*	14.03	4.89	13.64	5.23
4. QUEENS V-M	21.05	6.57	21.90	6.19
5. RATING SCALE+	28.32	9.07	30.67	8.76
6. PINTNER-CUNN IQ	113.21	13.78	116.31	14.29
7. MAT WORD KNOW.	2.25	.55	2.33	.53
8. MAT WORD DISCRIM.	2.42	.64	2.57	.64
9. MAT READING	2.35	.76	2.51	.77
10. MAT AVG.RDG.	2.35	.55	2.46	.61
11. AGE IN MONTHS	83.03	3.15	82.57	3.26
N	62	62	42	42

* The Bender was scored in terms of total errors.

\+ The Rating Scale had a constant of 22 points added to eliminate minus scores.

TABLE IV

Intercorrelations Among Pretests and Final Tests, 1963-64 Study, for Total Populations and Control Group

	1	2	3	4	5	6	7	8	9	10	11
1. GATES VISUAL PCP.		.455	-.233	.457	.575	.601	.565	.618	.611	.637	-.013
2. GATES RHYMING	.553		-.140	.503	.508	.389	.299	.423	.410	.403	.181
3. BENDER	.208	.150		-.517	-.369	-.406	-.139	-.262	-.201	-.182	-.204
4. QUEENS V-M	.510	.350	-.508		.462	.559	.419	.390	.384	.425	.189
5. RATING SCALE	.568	.507	-.321	.371		.604	.476	.552	.606	.586	-.065
6. PINTNER-CUNN IQ	.589	.367	-.389	.523	.563		.543	.551	.610	.614	-.266
7. MAT WORD KNOW.	.644	.333	-.153	.397	.434	.563		.771	.816	.929	-.169
8. MAT WORD DISC.	.629	.541	-.322	.400	.587	.577	.747		.826	.816	-.183
9. MAT READING	.612	.510	-.182	.373	.590	.624	.773	.829		.967	-.189
10. MAT AVERAGE	.672	.592	-.171	.423	.578	.624	.894	.746	.948		-.199
11. AGE IN MONTHS	.146	.231	-.231	.235	-.040	-.201	-.140	-.108	-.127	-.120	

Note: Correlations in the upper part are based on the Total Population of 62 children; r's in the lower part are based on the Control Group of 42 children.

TABLE V

Predicted and Obtained Reading Scores for the Four Groups Given Special Teaching

	Group	N	MAT Average Reading Grade		t	P
			Predicted	Obtained		
1.	Kinesthetic Exper.	7	1.89	1.90	.05	>.10
2.	Kinesthetic Control	4	1.80	2.15	1.12	>.10
3.	Phonic Exper.	5	1.96	2.20	.89	>.10
4.	Phonic Control	4	1.95	2.33	1.06	>.10
5.	Total	20	1.90	2.11	1.72	=.05